

Introduction of Products

1,500 kVA AND 1,000 kVA DRY TYPE TRANSFORMERS FOR UNDERGROUND SUBSTATION OF A DEPARTMENT STORE

By

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I. INTRODUCTION

An 1,500 kVA and an 1,000 kVA dry type transformers of H class insulation have recent been supplied to the underground substation of a department store. The great merits of the dry type transfor-

mers are that they are fire-proof and explosion-proof. The present supply is a representative example of application of these transformers making use of their merits.

II. SPECIFICATION AND RATING

Two transformers are used for lighting and power services of the building, each having following specification and rating.

Forced air-cooled dry type transformer

No. of phases	3
Cycles	60 c/s
Capacity	1,500 and 1,000 kVA
Primary voltage	23-22-21-20 kV
Secondary voltage	3.3 kV
Connection	Δ/Δ
Insulation tests	A-c 1 min,
	H.T. side 50 kV
	L.T. side 15 kV
	Impulse $1 \times 40 \mu\text{s}$ wave
	H.T. side 120 kV

The performances, weight and dimensions of the 1,500 kVA one are ;

Iron losses	7.4 kW
Copper losses	8.6 kW at 75°C
Efficiency	98.95% at full load
Impedance	5.32%
Cooling air	60 m ³ /min.
Weight	7,000 kg
Dimensions	3,350 × 1,160 × 2,465 (Height) mm

III CONSTRUCTION AND MATERIALS

The iron core consists of laminated silicon steel plates, class T-90 of Yawata Steel Works, with Carlite layer insulation. The conductor of windings is of glass fibre insulation while the main insulation (the insulation between H. T. and L. T. windings) consists of glass mica and asbestos. Both H.T. and L.T. windings were wound as cylindrical-layer winding. Vertical steatite distance pieces

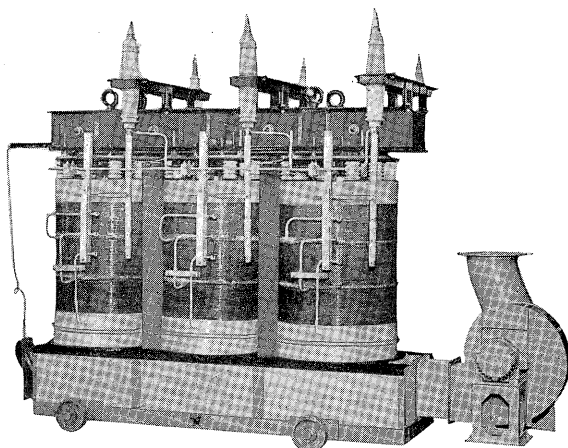


Fig. 1. 15,00 kVA dry-type transformer

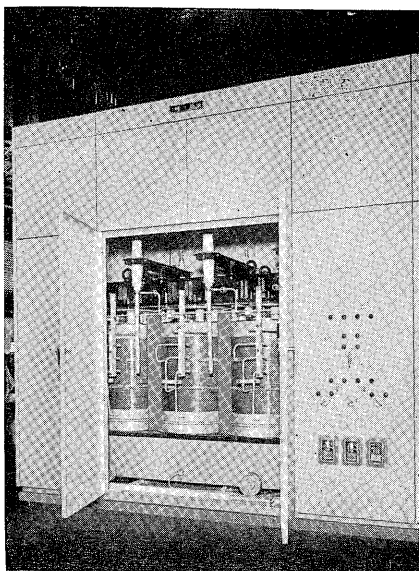


Fig. 2. 1,500 kVA dry-type transformer in cubicle

between the coils keep the winding rigid against short circuit and form the ventilating ducts for cooling air. After winding up of the H.T. winding on the L.T. winding, the winding as a whole was finished with silicon varnish of Shinetsu Chemical Co..

The cooling fan blows the air from the underneath of the transformer. (Fig. 1)

IV. TRANSFORMER CUBICLE

These transformers can conveniently be installed in cubicles as shown in Fig. 2. The 1,500 kVA transformer is in the front. The door is interlocked with the corresponding main circuit breaker so

as to avoid careless touch on live parts during sending condition. In the cubicle and on the left hand side of the transformer is a 23 kV water circuit breaker while on the right hand side is the cooling fan and disconnecting switches.

V. CONCLUSION

For mines and ships, we have already supplied a large number of dry transformers with B class insulations or H class insulations. Present supply, however, is a typical one for underground substation and we hope their further wide developments in the near future.